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INSERVICE EDUCATION--PSYCHOLOGICAL PERSPECTIVES.

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THIS REPORT SUMMARIZES AND EVALUATES LITERATURE AND RESEARCH DEALING WITH THE PSYCHOLOGICAL SETTINGS FOR BEHAVIORAL CHANGE WITH RELEVANCE FOR INSERVICE TEACHER EDUCATION. IT WAS DESIGNED TO PROVIDE A BASIS FOR DECISION MAKING BY THE PROFESSIONAL STAFF OF THE FAR WEST LABORATORY IN BERKELEY, CALIFORNIA. IT CONTAINS SECTIONS DEALING WITH (1) THE HISTORY OF INSERVICE EDUCATION, (2) THE IDEAL GOALS OF INSERVICE TRAINING, (3) ANALYSIS OF INSERVICE PROGRAMS WHICH HAVE BEEN TRIED, (4) "THE ACCEPTANCE OF INNOVATION," WHICH EXPLORES THE QUESTION OF RESISTANCE TO NEW IDEAS AMONG SCHOOL PERSONNEL, (5) HOW INSERVICE PROGRAMS SHOULD BE EVALUATED, (6) FUTURE INSERVICE PROGRAMS, AND (7) RECOMMENDATIONS FOR IMPROVING PROGRAMS, TEACHERS, THE PHYSICAL SETTING, EVALUATION METHODS AND RESEARCH. (AW)

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Inservice Education: Psychological Perspectives

By James J. Asher

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FOREWORD

This review of the psychological settings for behavioral change with relevance for teacher inservice education was conducted by Dr. James J. Asher, Professor of Psychology, San Jose State College, San Jose, California.

The review was conducted to provide a basis for decision making by the professional staff of the Far West Laboratory, Berkeley, California.

The Laboratory was required to commence its major program, Teacher Education, before the review could be completed, so the material then became a basis for decisions about other activities within the Teacher Education Program of the Laboratory. It also provided psychologically-based material for another document on inservice education provided for the Laboratory, viz., Inservice Education: Perspectives for Educators by Dr. Dorothy Westby-Gibson, Professor of Education, San Francisco State College.

Both of these reviews were products of a study of the requirements for the education of teachers and other professionals. The team conducting this study included Drs. Asher and Westby-Gibson as well as Dr. Peter Etzkorn, then Chairman, Department of Sociology, University of Nevada; Mrs. Gaither Lee Martin, Coordinator, ITV, San Jose State College; their respective research assistants and this writer.

The research assistants ably assisting Dr. Asher were Mrs. Joan Bean and Mr. George Canney, M.A. candidates in Psychology at San Jose State College.

Warren Kallenbach
Project Director
Teacher Education Program

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INSERVICE EDUCATION : PSYCHOLOGICAL PERSPECTIVES

James J. Asher

Introduction

Perhaps the importance of in-service education has been expressed with the greatest simplicity and clarity by Charles D. Lowry who was District Superintendent of Schools in Chicago. Lowry said, "The work of making good teachers must be carried forward steadily because of the immaturity of teachers on entering the profession, the unevenness of their preparation, the singular lack of external stimulus connected with practice of the profession, the complex nature of the work that must be intrusted to even the poorest teacher, the profound injury that results when the work is badly done, the constant change in methods and curriculum." (Henry, 1957, p. ix)

Preservice and in-service education are activities on the same continum. The training before the individual is credentialled to teach is preservice education and later training is called in-service education. Both segments of the continum have many of the same goals, strategies and problems.

This position paper will begin with a brief history of the service education. Historically in-service education was invented to correct serious deficiencies in preservice education. Then, as preservice training developed into professional college prepar-

ation, the concept of in-service education shifted to a notion of expanded training and retraining so that the teacher could remain current with the most recent innovations in education, science and technology.

After the section on the history of in-service education, the ideal goals of in-service training will be presented followed by programs which have been tried.

Then there will be a section entitled, "The Acceptance of Innovations." This section explores a problem which seems to be unique to in-service education. That is, is there resistence to new ideas among school personnel? What factors might account for the resistance? How should information about instructional innovations be disseminated so that resistance is at a minimum?

The next section will probe perhaps the most serious deficiency in in-service programs: How should the program be evaluated? Then, a section on future in-service programs, including the application of television and computers; finally, a section with our recommendations, and a section which summarizes the entire paper.

A Brief History of In-Service Education

Before 1890

Richey (1957) stated that during the time between the creation of state systems of public schools and the nation's recovery from the Civil War there were some good teachers, but as a rule teachers had no more than a common-school education, had been exposed to arithmetic but did not understand it, and their knowledge of English grammar was superficial. Only a few teachers considered teaching anything more than a transitional activity before one went into a profession or as a genteel thing to do between girlhood and marriage (Smart, 1885).

Superintendents of education complained that year after year one-half of their teachers were under twenty-one years of age and a sizable number was under sixteen. One-half to three-fourths of the teachers changed positions each year and one-fifth or more were teaching for the first time (Addis, 1891).

Since so many teachers were inexperienced and untrained in the subject matter to be taught and in professional skill, the Teacher's Institute was invented. The early institutes were designed to review and drill teachers in elementary subjects, but later more time was given to methods of teaching and school management. This instruction was usually in a lecture format delivered by normal-school teachers and other persons who traveled the institute circuit.

Sweet (1848) reported that early institutes stressed drill in

elementary subjects, but there were often lectures described as "inspirational and cultural." For example, there was a lecture on elocution illustrated with specimens of oratory from Daniel Webster, Henry Clay, John C. Calhoun and Colonel Crockett. And there were lectures on methods of teachings such as one on "Elementary Reading" and another on "Organs of Digestion with Practical Hints for Teaching."

1890 To 1930

In 1890 few teachers had received a high school education, but by 1910 many states required a high school diploma before one could get a license to teach (Updegraff, 1911). By 1930 more than three-fourths of the states required high school graduation for certification as a teacher, and between 1926 and 1937 thirty-two states stipulated one to four years of college as a prerequisite for licensing.

The Teacher's Institute. As other facilities for teacher-training became available, the Teacher's Institute was the target for many attacks. For instance, McMannis (1903) said that lecturers in the institutes talked about pedagogical principles but violated them by preaching activity while the audience was strictly passive. Seerley (1908) charged that the institutes dissuaded teachers from pursuing the longer, better organized and more exacting programs of the summer normal school. Reudiger (1910) said that the institute which once served a useful purpose was now becoming an

anachronism. He recommended that the institutes should have programs which did one of the following: (a) were a professional training-school for teachers, (b) were a meeting to inspire teachers and acquaint them with the policies of their schools, or (c) hold teacher's conventions, largely social in nature. By 1933 institutes were becoming extinct and other forms of in-service training substituted.

Teachers' reading circles. One of the substitutes for institutes was the reading circle which by 1910 appeared in three-fourths of the states. The work of the reading circles is difficult to evaluate, but teachers were introduced to general books of literary merit and were motivated to continue reading such books.

The summer school. After 1910 the movement started by the University of Chicago in the nineties to make the summer session an integral part of the academic program increased rapidly. In the summer school the teacher could do college work.

Extension courses. Extension courses after the turn of the century raised their standards for admission and granted college credit. By 1910 correspondence courses were offered by ten state universities and a number of colleges.

The role of the supervisor. The most powerful change agent for the improvement of teachers was thought to be the supervisor. Lowry (1908) said that special supervisors should give model lessons in each classroom, criticize the work done, give directions for future work and hold classes to instruct the regular teachers. Sub-

ject supervisors should visit teachers and help them with their preparations and special problems.

The supervisory staff was considered the authority who should determine the curriculum, textbooks, standards and methods of instruction. They judged whether the teacher achieved the standards in materials used and methods of instruction.

As the training of teachers increased, the role of the principal changed from director to one who had skill in group problem solving. Historically the primary prerequisite for a principalship was the ability to handle unruly children, but later when teachers were thought of as professionals sharing in educational decision-making, the principal's task was to collaborate with teachers for group problem solving.

Goals

Corey (1957) felt that while the goal of preservice training was memorization of subject matter and the answers to instructional problems, the goal of in-service education should be preparation for independent and creative problem-solving---usually as a cooperative group activity. In fact the point of view which dominated the fifty-sixth year book of the National Society for the Study of Education was that in-service education should provide maximum opportunity for cooperative group problem-solving. Specifically, it was strongly recommended that small groups of teachers have the opportunity to identify a problem on which they want to work, decide on the most productive ways to solve the problem, have access to a variety of resources, try out the idea and evaluate the results.

In a different attempt to identify goals of in-service education, this committee examined a sampling of in-service practices in Northern California and Nevada (Kallenbach, 1966). We discovered a divergency of activity which ranged from listening to haiku verse for general self-improvement to a Saturday bus ride for a day of exploration into an oil field.

It was possible, however, to categorize the in-service practices into four basic goals which were:

1) Skill training
2) Information
3) Attitude change, and
4) General self-improvement

Skill training. Skill in this context seems to have two meanings. In one sense, skill means that one can do something after training which he could not do before training. A behavior pattern did not exist until a certain learning activity had been completed. For example, Edwin Black (Kallenbach, 1966) reported an in-service program in which English teachers, trained in the traditional style of grammar, learned to apply structural linguistics and transformational grammar.

The second meaning of skill is that a behavior pattern existed before training, but the learning activity was designed to increase proficiency. Proficiency may be defined as a reduction in reaction time necessary to perform a task or a reduction in effort, probably through a process of information reduction. Skill in the second sense depends more on information reduction than on information acquisition. Specifically, one eliminates informational "noise" ---irrelevant detail---masking the figure-ground organization which has the greatest simplicity. As an illustration, a dentist told his patient, "Look, I can extract your impacted molars but it will take me an hour. Dr. Dundee specializes in this procedure and can perform the extractions in ten minutes." The implication is that both dentists have the basic skill but one can accomplish the task in less time and probably with less effort. Further, it is hypothesized that the reduction in time and effort may be a function of a reduction in informational "noise."

Dr. Dundee, through constant practice with impacted molars, has eliminated informational cues---kinesthetic, tactile and cognative ---which are irrelevant. Dr. Dundee has discovered simpler and simpler figure-ground organizations which result in automatic reductions in time and effort.

As this concept of skill applies to in-service education, one may refer to a report by Arthur L. Costa (Kallenbach, 1966) concerning the technique of inquiry. Most teachers have used inquiry as a method, but the intent was to increase the teacher's proficiency with the technique.

Information. Skill tends to be associated with performance, usually physical activity. Information is cognative input which may not necessarily have a one to one relationship with output or performance. In skill, output is congruent with input if the training is successful. If performance is, in a sense, a non-reversed mirror image of the model, one has achieved the skill. In skill, the performance tends to be terminal and not intended for transfer to some other learning activity. For instance, when one learns the backstroke in swimming, the training is complete when the learner's behavior is a replication of the model.

With information, one does not necessarily expect a one to one correspondence between input and output. The elements of transposition and novelty may transform the incoming information into unpredictable outputs. The classic illustration of this form applied to linguistics is the achievement of fluency in speaking a language.

One is not fluent if input is only identical with output. If the learner can only say what he has heard the model say in training, he has not achieved fluency. Fluency depends on a transposition of input utterances into novel outputs. For example, the three-year-old child has achieved fluency in English when he utters perfectly grammatical sentences which he has never heard before, as when Kiki Powers, age three, told her mother, "Mommy, you're the best mommy in the mommy business."

This notion, as it applies to in-service education, can be shown through a report by Rosella Linskie (Kallenbach, 1966). In Mrs. Linskie's program, teachers discovered their community in Saturday bus rides to an oil field, an Indian village and a lumber site. Somehow we expect that the information from these experiences will be transposed into projects, units and field trips for students. If the result of the experiences is that the teacher simply recites details of the trip to her class, we would be disappointed. Rather, the intention is that the information will have divergent transformations into novel outputs.

Attitude change. A third goal of in-service education may be to modify attitudes. Attitudes are defined here as positive or negative feelings towards people, events or things. For example, the aim may be to shift teacher attitudes toward minority groups or toward community problems or toward research within public schools. A specific illustration of this is an in-service program in human relations as described by Irving Katuna (Kallenbach, 1966).

In Katuna's project, the intent was to enable teachers in a San Francisco school district "to evaluate their feelings and understandings" of teacher and community problems in a changing metropolitan public school system. The strategy for attitude change was maximum discussion and interaction by the teachers themselves, supplemented with panel presentations and lectures by community leaders, field trips and on-the-scene discussion of problems in selected neighborhoods.

There is an intricate research literature on attitude change and from this literature, two implications seem especially relevant to the problem of in-service education. The first is that most studies of attitude change do not show long-term effects. An important research problem would be to demonstrate the conditions under which long-term attitude modification can be achieved. The second implication is that there is not a simple one to one relation ship between information, attitudes and overt behavior. This is illustrated in studies of attitudes toward smoking. Feather (1963) has shown that smokers are just as aware of negative information about smoking as non-smokers, but the smoker is apt to evaluate the data differently. Even though there is no significant difference in the knowledge about smoking research between smokers and non-smokers, the smoker tends to be less convinced about a causal connection between smoking and lung cancer.

Pervin and Yatko (1965) explored further and found that 92 percent of the smokers in their sample agreed with the view that

"It is hard to escape the conclusion that the statistical relationships found reflect a direct causal connection between smoking and lung cancer." Smokers tend to accept this statement as an abstraction, but disbelieve the implications as these apply to individuals or groups. The smoker is apt to believe that the risk is not personally relevant to him. For example, Pervin and Yatko stated that "Compared to non-smokers, smokers tend to feel that one has to smoke for a longer time to be in danger and that a cure for all cancer will come sooner." (p. 33)

Perhaps the complex relationship of attitudes to overt behavior can also be shown in the literature from educational television. In a review of experimental studies in educational television since 1950, Greenhill concluded that "...most of the studies of students' attitudes toward instructional methods have found little or no relationship between attitude toward or preference for different methods of instruction, and actual measured learning from those methods." (Maclennan, and Reid, 1964, p. 23)

Apparently the student's evaluation of specific television courses and his affective reactions, no matter how negative, do not retard his learning. One intuitively would expect a direct correspondence between attitudes and overt behavior, but in the case of instructional television none has been shown.

In-Service Education Programs

Berge, Russell and Walden (1957) selected 314 school systems to represent in-service education programs in the United States. From questionnaires sent to these school systems, 145 responded. The in-service programs were then organized into three categories: the centralized approach, the decentralized approach and the centrally co-ordinated approach.

Centralized Approach

This approach is based on the notion that curriculum development should be initiated, managed and usually conducted by persons in the central office of a school system such as the superintendent, curriculum director or supervisor. Of the 36 schools which fell into this category, the problems chosen for committee study seem to be selected because of their significance to central-office personnel rather than to members of the teaching staff. Most of the problems were concerned with subject matter offerings of the school system. It would appear that the central office dominates the in-service activities and gives little attention to the psychology of change which suggests that individuals are more likely to change when they work on problems significant to them and when they share in the problem solving decision.

The Decentralized Approach

This is the conviction that curriculum improvement is the responsibility of the individual school staff. The central office may be aware of such activity in the local school unit and it may pro-

vide consultant service, but it assumes a minimum of responsibility for initiation, direction or co-ordination of the programs.

Of the respondents, 26 schools, or 18 percent were classified as decentralized. The problems reported indicate that individuals and groups were working on problems of significance to them. The topics most frequently mentioned were materials of instruction, teaching techniques, records, reports, child study, guidance and human relations.

Changes as a result of in-service activity were new guides and courses in subject areas, improved services to students, better student achievement, revised reporting systems, improved practices in unit teaching, grouping and long-range planning. Other less tangible changes were improvements in professional attitudes, better understanding of children, more exchange of ideas between teachers and a closer cooperation of facultics.

Centrally Co-ordinated Approach

This is a combination of the other two approaches in which there is a co-ordination of local programs through the central office. The co-ordination is shown in planning, problem-solving and the provision of resource people and consultants.

Fifty-seven percent, or 83, of the school systems sampled were in the category of the centrally co-ordinated approach. There were indications that the central office did not dominate in-service projects since much of the teachers participation on planning committees was voluntary.

In over three-fourths of the school systems in this category, evaluation was a part of the in-service program. Thirty-eight percent used oral reactions, 20 percent used unsigned questionnaires and 45 percent used a combination of evaluative techniques.

The Psychology of Change: Some Guidelines

J. Cecil Parker (1957) presented guidelines "for planning, organizing and conducting in-service education activities and programs in schools and school systems." This model was programmatic rather than instrumental because Parker offered generalizations which were rarely translated into operational terms. Perhaps the Parker article is rather typical of the discussion type papers available in the literature on in-service education.

The intent here will be to give a synoptic review of Parker's conceptualizations and in each instance to indicate where a transformation into operational terms is necessary if we want administrators and teachers to apply these ideas to their own in-service problems.

Parker begins with the idea that an important problem for in-service education is one which has <u>significance</u> for the people involved. The term "significant" means that the individual can become involved in it emotionally as well as intellectually; the problem can be seen as a basis for action and a solution is demanded by the situation.

At an abstract level of thinking the three criteria of significance seem rather satisfying. But when one searches for ways to implement the criteria, none seem visible. For instance, should the principal gather teachers around a table and then say, "Will each of you please suggest one problem which we will study and eventually solve as a group?" Or, should the principal have a list

of problems from which the group selects one for exploration? How does one recognize when the members of the group are emotionally and intellectually involved in a problem? Does the format in which a problem is presented to a group determine the extent of emotional and intellectual involvement? What effect do individual differences among teachers have on emotional and intellectual involvement? What individual differences are important for this involvement to occur? Data are non-existent for all of those questions which should be answered if school personnel are expected to make the transition from a prescription to action.

The second guideline suggested by Parker is that the same people who identify the problem should determine the goals and plan the means for achieving the goals. This guideline is operational.

The third guideline was that there should be many opportunities for members of the group to relate themselves to each other. Operationally, this means either small subgroups of two or three people, or informal contacts as when two people meet casually for lunch.

The fourth guideline is that one or more persons should provide expert help in individual and group problem-solving processes. Parker feels that "there is no one pattern or set of logical and sequential steps of problem-solving processes. Each group should make its own plans and possibly may not use the same procedures more than once or twice." (p. 111) However, these thoughts may assist the group in the problem-solving process:

1) Do we have realistic goals?
2) Are we working on specific problems?
3) Are we moving from identification problems to an attack upon a problem?
4) Are we utilizing all potential resources---group members, consultants, research, facts, feelings, experience, opinions?
5) Are we planning and utilizing a variety of procedures?
6) Are we achieving variety in the role structure in the group?
7) What are our strengths and weaknesses in communication?
8) Have we agreed upon methods of making decisions?
9) Have we developed means of assimilating new members and late arrivals?
10) Are we studying the relationships of our groups to all related individuals and groups?
11) Have we perfected means of moving from decisions into action?
12) Are we making evaluation, testing, and assessment of consequences significant at all times?
13) Are we accepting the facts of differences in perceptions of group members?

The problem-solving guidelines are programmatic since the operations which permit one to decode the generalizations into behavior have yet to be stated.

The next guideline is to create an atmosphere where members of the group feel maximum security within the group because this feeling is a prerequisite if members are to take responsibility, initiative and provide leadership for others.

Specifically, how is security created within a group? How is security recognized? Is it possible that a group can feel too secure? There are data suggesting that a certain level of tension facilitates productivity. A complete absence of anxiety may be contra-indicated for group problem-solving. All of these questions are fundamental if Parker's fifth guideline is to be translated into action.

The sixth guideline is to use a multiplicity of resources. Resource persons can come from the school staff, parents, custodians and professional people in the community. This is a suggestion which can be made even more workable if careful records were kept of the experiences, talents, skills and special interests of all adults in the community. Such a talent inventory could be invaluable to any group attempting to solve an educational problem.

The seventh guideline is to develop the simplest possible means to move from decisions to actions. Again, here is an idea which one is apt to agree with at an abstract level of thinking, but operationally, what is meant by the "simplest possible means"? What criteria can be used to differentiate the simple from the complex? And, how simple is simple? When should the creative process stop?

How do we identify the optimal pattern of simplicity?

The eighth guideline is to build an experimental climate in a school so that teachers will feel free to try out new ideas. Operationally, this is accomplished by constant encouragement and support, especially by those in status positions such as the principal.

The ninth guideline is that evaluation should be an essential aspect of an in-service project. Parker recommends that factual data be separated from value judgment in an evaluation effort.

Perhaps this is the most important idea in the Parker article. A group can invent a program which intuitivoly appears to be most effective but without an adequate set of evaluative data, the program remains undocumented and therefore has low credibility. From the sample of in-service projects drawn from Nevada and Northern California, it was was rare to find one with evaluative data (Kallenbach, 1966).

The tenth guideline is that the network of individuals in administration, supervision and teaching should interrelate. Of course the notion of optimal interrelating is highly abstract and needs a translation into operational terms before the concept can be a basis of action.

Perhaps a concept such as optimal interrelationships cannot be communicated except through case histories of organizations in which this ideal is approached. One example may be the Federal Bureau of Investigation which has become a model organization in

law enforcement partly because of optimal interrelating between agents in the field, scientists and technicians in the laboratory, and the administration.

The eleventh guideline is that individual differences of the group's members should be accepted and used. Here is a thought which most would agree with, but once again to act on this suggestion requires some operational transformations. For example, how should one cope with members who resist change? Should a "foot-dragging" style of thinking be rewarded?

The final guideline is that the group should not merely accept the status quo, but they should try to imagine better educational, social, economic and political conditions. The group should welcome new and even deviant ideas.

The Acceptance of Innovations[1]

A General Model

The general process by which innovations may be accepted has been analyzed in Everett M. Rogers' book, Diffusion of Innovations, (1962). In Rogers' book, the concept of how innovations become integrated into existing behavior was based on findings from 506 research studies taken from anthropology, education, and rural, industrial, and medical sociology.

One inference is that there are extensive individual differences in the readiness to adopt a new idea. There is evidence that the distribution of people who accept the innovation in time approximates a normal curve. Early versus late adopters show sharp contrasts. For instance, early adopters are less likely to discontinue the innovation. They require less adaptation time then late adopters. Adaptation time refers to awareness of the idea, evaluation, and trial. Early adopters try innovations on a smaller scale than later adopters. Early adopters are younger, tend to have higher social status, and have a more favorable financial position than later adopters.

In comparison with late adopters, early adopters tend to have a more specialized role and they have a different type of mental ability.

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[1]Most of the theoretical concepts and empirical data in this section were taken from review papers prepared by Dorothy Westby-Gibson (1967) and Peter Etzkorn (1967). Etzkorn contributed the sociological implications in the general model and Westby-Gibson conducted the literature search which showed how the problem of innovation acceptance applied to schools.

They are apt to be in close contact with information sources which originated the new idea and they utilize a greater number of different information sources. Early adopters are less dependent on the influence of their peers than late adopters. Early adopters are more cosmopolite and are more apt to be opinion leaders.

An opinion leader, which seems to be characteristic of early adopters, is described as one who has more impersonal, technically accurate, and cosmopolite sources of information than does the follower of an opinion leader. Opinion leaders have more social participation, higher social status, and are more innovative than their followers.

Besides individual differences as illustrated with early and late adopters, there are certain variables which either facilitate or hinder the adoption of a new idea. First, the process of adoption begins with awareness, then there is a period of evaluation followed by trial and climaxing in adoption or non-adoption.

In the awareness state important factors are that information sources are impersonal and cosmopolite while in the evaluation stage personal sources and local information seem important. In the evaluation state personal influence from peers has more effect than in any other stage. Further, personal influence from peers has more impact in uncertain situations than clear-cut situations. The time period from the point of awareness to the actual trial of the idea is longer than the time from the trial to the decision in favor of adoption.

A crisis such as when the Russians launched the first satellite, tends to emphasize the relative advantage of an innovation and increases the rate of adoption.

The rate at which an idea is adopted is affected by the compatibility, complexity, communicability and divisibility of an innovation as perceived by members of a social system. Another factor which influences the rate of adoption is the extent of promotional efforts by change agents. Commercial change agents have more influence in the trial state than any other stage.

As to how innovated people will be, this seems to be related to a modern rather than a traditional orientation, and the individual's innovativeness varies directly with the norms of his social system on innovativeness. Innovators are perceived as deviants by other members of their social system and innovators tend to perceive themselves as deviant from the norms of their social systems. When the orientation in a social system is modern, the flow of ideas will be impeded depending upon the differences in innovativeness between individuals.

In summary, Rogers presents a general model for the diffusion of innovations which is based on concepts of individual differences as characterized by early and late adopters, a cognitive process through which an idea must traverse before it is adopted such as awareness, evaluation, trial and then adoption, and finally, Rogers describes variables which influence the rate at which an idea moves through each stage.

As Applied to Schools

Van Dalen (1964) suggests that change is facilitated in school as a function of a readiness to consider change, the initiation of change and conditions which increase the probability of change.

A readiness for the teachers to change may be stimulated by encouraging teachers to be self-critical, optimistic about finding ways to solve problems, and confident about their capacity to cope with change. Give teachers the opportunity to observe schools that are making promising changes, encourage staff members with the greatest understanding of research techniques to take advanced study, and Van Dalen would ask professional people from the community to acquaint the staff with recent research.

Once the teachers are ready for change, the implementation can be achieved through maximum participation by teachers. This means that the teachers should make a thorough analysis of the problem, propose a number of solutions, evaluate each solution, select one proposal, then perfect it.

Further, there are certain conditions which facilitate change. For example, give teachers the time, materials and incentives necessary to solve problems. Establish lines of communication which are free of noise. This means that views can be exchanged without screening, a place is provided so that people can verify facts which will neutralize the tendency for rumors to be generated, and permit a wide range of people including parents, administrators and students to make suggestions and register objections.

As the problem solving progresses, there should be continual self-assessment, and openness to reconsider decisions, courage to discard a plan if it is not working, and a continuous search for ways to expand and improve.

Guba (1965) contrasts change in education with change in other fields as agriculture and medicine. Change in agriculture should not be a literal model for education because of these considerations. First, the decision to change in education is made by an agent of a bureaucratic social system. Whereas in other fields the decision is made by an individual entrepreneur---the farmer or physician. Secondly, sources of information about innovations in fields other than education may be well institutionalized. An example of this would be the agricultural experimental station. Thirdly, innovations in other fields are based on research evidence and are thoroughly field tested before being made generally available. An example would be the Salk or Sabin vaccine for polio. Innovations in education may not be research oriented partly as a function of the difficulty in developing adequate criterion measures. In agriculture and medicine criterion measures tend to be specific, operational, representative and easily accessible. In education, even the variable of learning is so complex that it is difficult to translate into meaningful operational measures. The criterion measure of learning must consider such complexities as socio-economic status of the school, the teacher, and individual differences among students.

Thirdly, most innovations in ot er areas are disseminated through institutionalized change agents such as the county agricultural agent. There are few effective institutionalized change agents in education with the possible exception of the textbook salesman.

Fourthly, the acceptance of educational innovations is affected by forces not present in other fields. For instance, there are "product specifications" such as those articulated by state examinations and by textbooks. There is the belief in local autonomy in controlling the school and the belief that the teacher is an autonomous professional who must be completely responsible for his curriculum, methods and content. Then still another factor is the belief that teaching is an "art" which can be judged and guided only in intuitive terms.

In the Lippitt et al (1967) article, which appeared in Richard I. Miller's book, Perspectives on Educational Change (1967), forces which block or advance the adoption of innovations are identified with the principal, the individual teacher, the teacher's peer group, the physical facilities, and characteristics of the proposed innovation.

The principal can enhance the adaptation of innovations by supporting experimentation. This support is shown in rewarding attempts at experimentation, being involved himself in the problem, being open to suggestions from teachers, encouraging a two-way flow of information. A specific example of such a principal is

Mr. Al Trawinski who is the principal at the Laurelwood School in Sunnyvale, California. Mr. Trawinski supports experimentation by participating himself in innovations within the school. For instance, three days a week he uses a novel procedure to teach kindergarteners printing; he teaches in an experimental ungraded reading program; he organized parents to begin a pre-school for two-and one-half-year-old children; he drives three special groups of children, who are neurologically handicapped or mentally retarded, to swim classes at the Y. M. C. A. every Tuesday evening; and, he keeps his school open until eleven o'clock every night for a community school.

Rogers categorized individual differences in the receptivity to innovation as early adopters and late adopters. Lippitt categories could be represented as open versus closed teachers. Teachers who are "closed" resist change, fear evaluation and reject any implication of failure. They tend to be dogmatic, pessimistic, afraid to experiment and negativistic about group work. As might be expected, teachers who are open tend to show behavior in converse to the closed teacher. For example, the open teacher is searching for new ways, seeks help from peers and consultants, and is receptive to the possibility of adapting or modifying practices. This individual is optimistic, able to pattern a practice to fit his own style and class, perceives the group as instrumental for academic learning, and understands the connection between mental health and academic learning.

A teacher's peer group can block the adoption of innovations when there is not much communication between teachers, when the group norm enforces privatism, and when peers generally react negatively to new ideas. The peer culture increases the rate of adoption when the sharing of problems and practices become a matter of school routine, public recognition is given to innovators and adopters, and innovation diffusion is perceived as a cooperative task. In this setting the sharing of ideas is expected, social norms support the asking and giving of help, and there is a continual search for new ideas.

Obstacles in the physical situation include: no time for teachers to get together, too many clerical duties to share ideas, classrooms are isolated, and no rooms are available for meetings. When the physical setting is patterned as follows, the diffusion of innovations is facilitated. Teachers are encouraged to meet frequently by hiring substitutes to free the teachers, lunchtime is used for discussions, students are sent home for an afternoon, and extra clerical help is provided.

A new practice is not apt to be adopted if the idea requires a great output of energy, new skills, a change in teacher values or new facilities. When the new practice has the following features, the probability of adoption is enhanced: consultant and peer help is available to develop the idea; it can be done a little at a time; there is a built-in evaluation to make progress visible; and the idea is student-oriented rather than subject-oriented.

The authoritarian teacher. Bean and Asher (1967) searched the literature in social psychology for studies which related the authoritarian personality to teaching. The expectation was that the higher the authoritarian tendencies, the greater the rigidity and therefore the more the individual is apt to be closed, inflexible, and a late adopter.

Most of the studies to be reported next measured authoritarian tendencies with the F-scale (Adorno, et al, 1950). Juul (1953) investigated the F-scale scores in relation to attitudes toward child behavior. The subjects were college seniors in a teacher training curriculum. Juul hypothesized that teacher trainees with higher F-scale scores would be more authoritarian and would have lower scores on a measure of teacher attitudes entitled, "How I Teach." The teaching attitudes in the latter scale were based on concepts from child psychology, mental hygiene, and modern learning theory. The hypothesis was supported with a negative correlation between the F-scale and the "How I Teach" measure.

At the University of Michigan, Levinson and Schmerhorn (1951) wanted to know how an eight-week in-service summer workshop would affect the participants' scores on the F-scale. They found that teachers (N = 21) had significantly higher F-scale scores than non-teachers (N = 11) before the workshop and also after the workshop experience.

At the University of Illinois, Jones and Gaier (1953) found that teacher trainees scored significantly higher on the F-scale

than non-teachers. Items discriminating most between teachers and non-teachers were concerned with social customs and mores. A further analysis showed that scores on authoritarianism were not related to age, length of teaching, school level taught, the frequency of church attendance or political affiliation.

Brumbaugh, Hoedt and Beisel (1966) used high and low scores on Rokeach's dogmatism (D-scale) to represent operationally closed- and open-mindedness. They found that student teachers in mathematics, science and social studies were significantly more likely to be closed-minded than those in foreign languages, English or Fine Arts. Curiously, there were no significant differences in open-mindedness for the supervising teachers in each academic area mentioned.

Future research with the F- or D-scales as applied to teachers should control for age, years of teaching experience and academic areas of interest. It has yet to be shown that a measure of authoritarian or dogmatic tendencies in teachers is related to overt behavior in the classroom such as open-mindedness to innovations, early adoption of innovations and effectiveness of teaching.

The Brickell Report

Perhaps the most important document to study for insight into the problem of educational innovation is "Organizing New York State for Educational Change" by Henry M. Brickell which was published in December 1961. This report was based on data collected from 100 public school systems representing the total range of types and

sizes in New York State. Fifteen hundred classrooms at all grade levels were visited long enough to get an over-all impression of the kind of educational program, the kind of teaching personnel, and the kind of physical facilities which characterized the school system. Almost all interviews were with administrative personnel. In addition, thirteen colleges and universities were visited and faculty members in the departments of education were interviewed.

Next, a synopsis will be presented of variables which may have a powerful effect on change within school systems. The Brickell Report begins with the observation that the firing of the Soviet Sputnik I on October 4, 1957 produced educational innovations in New York State which doubled the usual rate of change. Interestingly, these accelerated changes were almost all concerned with content of courses and the grouping of students. There was almost no change in the kind of school personnel employed, the way in which these people were organized, and the physical arrangement of time and rooms.

The school as a social institution may be conceptualized as six structural elements: teachers, students, subjects, methods, times, and places. The Brickell Report tries to describe significant shifts in the normal arrangement of those institutional elements. First, how does the public, the board, the administrator, and the teacher influence change? The public and the board of education are lightweight variables in the initiation of specific innovations. Usually it is not necessary to arouse active enthusiasm from either of these two groups for specific changes. However, either

group can be powerful forces to block an innovation if there are strong feelings of opposition.

Contrary to general opinion, administrators and not teachers are effective change agents for educational innovations. The teacher is not an independent professional who is free to decide what he will teach to whom at what time and at what price. As long as he remains inside the classroom, he is in total control. Once outside the classroom, he does not have the authority to propose a new type of instructional program. Therefore, the decision-making for any major educational innovation is determined by the administrator.

Only three types of educational change can be made by the teacher without interdiction by the administrator. First, the teacher can change a classroom practice within his own classroom. Secondly, the teacher can reorganize existing content in collaboration with another teacher. For instance, arithmetic topics can be rearranged between the fourth and fifth grades. Thirdly, the teacher can introduce a single special course. A teacher may return from a summer institute and urge the administrator to schedule a course for bright students. Note that this course is usually terminal and does not have an effect on the work of other teachers.

Few new instructional programs are invented in any local school system. Most local changes are adaptions of programs used elsewhere. The decision to try or not to try a new program is conditioned by a number of factors. First, any new program in other school systems

is suspect. The suspicion is generated by the belief that the new program has been concocted to get outside recognition and does not have any real advantage over current practice. If in many visits, it is discovered that the novel program is no better, this is deeply satisfying because it reassures us that "our local children have been well served all along."

Secondly, speeches, literature, research, reports and conversation are interesting, but not as convincing as a visit to a successful new program. Thirdly, the visit to a new program will be persuasive depending on how similar the visited school is to one's own school. The greater this difference, the stronger the tendency to conclude that "the program cannot be duplicated in our school" or if duplicated, it might fail. Fourthly, instructional innovations are almost always evaluated by observing the reactions of the students while they are receiving the new instruction. The student's affective reaction is the most convincing measure of success. If students react with interest and enthusiasm, the program is apt to be judged as successful.

Surprisingly, the Brickell Report expresses the opinion that colleges, universities and professional associations have almost no influence on innovations in the New York public schools. Institutions of higher learning are not organized or financed to introduce a new instructional program. Colleges deal with individual teachers and the individual teacher is not a strong agent of change. For a school system to adopt a new instructional pro-

gram requires that an effort be directed to the entire staff of a particular school. Further, teacher education programs are designed to develop "a general professional wisdom" rather than train individuals in specific instructional techniques. Actual instruction in specific techniques is the responsibility of in-service education programs sponsored by the schools that employ the teachers.

The publications of professional associations do acquaint school personnel with what is taking place in other schools, but the printed material and speeches have little persuasive effect. Presentations at professional meetings tend to be random, disjointed, overlapping, and unfocused. The report stated that, "it seems strange that teachers, who deal every working day with the problem of reaching sharply differing pupils, should do almost nothing to screen audiences or guide speakers so that better learning could take place at professional meetings." (p. 56)

The Brickell Report suggests that three critical events necessary for a successful innovation are design, evaluation, and dissemination. How these events work may be seen in agriculture, medicine or industry. For an illustration from agriculture, in 1887 the Hatch Act authorized the Federal government to finance agricultural experiment stations to discover something definitive the the college of agriculture to teach.

Then for twenty-five years the experimental stations tried to disseminate research findings directly to farmers with research

reports, three-day institutes, travelling exhibits, bulletins, speeches and demonstrations at the stations. Because these approaches failed, the Smith-Lever Act in 1914 created the agricultural extension service to solve the special problem of dissemination. Here is how the situation works: First, the experimental station uses basic research from agriculture and other scientific fields to invent a new strain of seed. The seed is then evaluated through carefully controlled tests in a variety of plots. If the tests are successful, the staff at the experimental station describes the results in research reports. Then the dissemination period begins.

An extension specialist translates the research into a practical plan for using the new seed. The county agent then promotes the use of the new seed by persuading one farmer to demonstrate its use on his farm so that neighboring farmers can observe the results. For farmers who want to change (Rogers would call this group the early adopters), the agent supplies all the information and support necessary to try the innovation.

Just as in agriculture, the three critical events in education for a successful innovation are design, evaluation and dissemination. Design is basic research from psychology, sociology and other behavioral sciences. This basic research is invented and tested in situations which are necessarily artificial, enriched and free. For instance, programmed learning, computerized instruction, PSSC physics, SMSG mathematics, BSCS biology, and CHEM and CBA chemistry were all generated in artifically created, free settings. All were

developed in situations where the researchers had the time, funds and freedom of direction necessary to produce an innovation. None of these innovations was spontaneously created in the work-a-day environment of school systems.

Once the innovation has been created, the next step is field testing under controlled conditions. The novel procedure must be used over a period of time in a range of school systems and the results compared with the results achieved with other procedures.

Finally, the innovation must be disseminated. Perhaps here is where education should create a role analogous to the county agent in agriculture. The task of education's county agent would be to translate the innovation into a practical plan for specific school systems, then persuade "early adopter" type administrators to try the idea in their schools, so that neighboring administrators can visit and observe the results. Of course education's county agent would need the financing to enable him to supply all the information, skill and materials the adopting administrators need to try the change.

Contribution of the Educational Psychologists

It is curious that even research-oriented educational psychologists have not been primarily interested in new instructional innovations. For example, a search of the Journal of Educational Psychology between the years of 1955 and 1967 produced only one study reporting data on an instructional innovation used in the classroom. Significantly this was carried out with the perennial college freshmen in a mathematics course (Ahmann and Glock, 1959). An experimental class in freshman mathematics was designed to meet the weaknesses of entering students as defined by ACT scores. Participants were selected from a list of low scores---every second name was chosen.

The course content included a review of junior high school arithmetic, elementary algebra, slide rule, ratio and proportion, trigonometry and logarithms. The same instructor taught six sections. Dependent variable measures were grade point average, final grades in courses involving mathematics, gains in knowledge of mathematics and the tendency to remain enrolled in the university. There was no statistical difference on the dependent variable measures between

those enrolled in the typical course offering and those enrolled in the experimental program. The authors report that subsequent mathematics achievement was not influenced by this experimental class, now was the freshmen attrition rate affected.

This study is discussed here to illustrate the paucity of research conducted in the classroom by educational psychologists. The regular classroom is least frequently the environment used for educational research. Note that the one study reported dealt with students from a select Ivy League university and the specific innovative idea is unclear. Was it the course content or the arrangement and timing of the subject? And educators interested in utilizing the experimental mathematics program would not find a description of "how to do it" now would he find a report of student characteristics and individual differences in performance before and after the program.

A representative sample of studies from the Journal of Educational Research was selected to demonstrate the range of educational variables of interest to researchers. The selection was made between the years of 1955 and 1967 from all studies concerned with elementary or secondary students in classroom situations. Not one of the studies abstracted was conducted with the child below the median in school performance. This is especially interesting when one considers that the Project Edinn report (1965) surveyed teachers and pupils in nineteen California school systems and found that one of the most important problems

as perceived by teachers was the need for programs, curriculum and techniques designed for children below the median in ability. These are not children at the extreme end of the distribution, such as the mentally retarded or neurologically handicapped, but children in the normal range who are below the median in ability.

It is true that educational psychology has generated a number of important innovations in instruction. For example, Harrington and Durrell (1955) studied reading readiness of 1000 first grade children, showing that auditory and visual perceptual skills are related to reading achievement. This study influenced new reading programs such as the Frostig Developmental Reading Program and the Sullivan Pre-Primer Reading Series. Both of these programs combine auditory and visual discrimination tasks with phonics training. However, not one of the studies published between 1955 and 1967 conducted an evaluation of a new program comparing it to a traditional one.

A few studies did approximate a classic evaluation. For instance Jackson (1956) wanted to evaluate the idea of an individual reading center which consisted of materials and games in the classroom. One group of first graders used the reading center as an adjunct to a traditional reading program, another group had only the traditional approach, and a third group had a combination of the traditional and the tutorial. No significant differences were found between the three approaches. The criticism of the Jackson study is that the independent variable, the reading center, was not evaluated by itself.

And, no information was reported on individual differences. It would have been interesting to compare the performance of children above and below the median in ability to explore how these important differences interact with the instructional program.

Not one study between 1955 and 1967 in the Journal of Educational Psychology, the Journal of Educational Research, or the Journal of Experimental Child Psychology* reported a longitudinal study of any instructional innovation. These long term investigations are important if we are to determine the practical effects of innovations. For instance, does the instructional format for reading in the first grade make any difference in how children read in the second grade? If an innovation has a transient effect which dissipates rapidly, then the practicality of the idea is limited.

In summary, the educational psychologist, who should give the strongest leadership in the invention and evaluation of educational innovations has not been completely successful for the following reasons. First, rarely does he study a phenomenon in the natural setting of an elementary or secondary classrom. Secondly, few of his independent variables are instructional innovations which can be applied to school children. Thirdly, almost all of his studies are a "one shot" type of experiment. Few are designed to show long term effects. And fourthly, individual differences are ignored. For example, it is not enough to demonstrate that on the average, instructional innovation A is significantly better than innovation

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* This journal began in 1964.

B. It is important to show how children in different parts of the ability continuum performed on procedure A and B. Teachers are not only interested in the ability extremes---the gifted and the retarded---but they want information on children in the normal range, especially those below the median in ability.

The Application of Behavior Modification

It may be possible to apply behavior modification to increase the rate at which school personnel adopt innovations. First an explanation of behavior modification, then several studies which illustrate how the concept is applied in a variety of situations, and finally some implications for changing receptivity to innovations.

This review is taken from a report by Canney and Asher (1967). The fundamental concept of behavior modification may be illustrated with an incident from a film by Smith, Kline and French entitled, "Reinforcement Therapy." In the Smith film, the behavior of mental patients is not conceptualized in traditional mental hygiene theory. One does not search for causes within the patient's history, nor does one try to explain the patient's behavior with a psychodynamic theory such as psychoanalysis. Rather, the behavior is viewed simply as maladaptive. The therapist says this, "Look, this person has certain behaviors which prevent him from getting and holding a job, which prevent him from maintaining a successful marriage, or which prevent him from communicating with other people. Therefore, our task is to substitute more acceptable, more adaptable behaviors for those behaviors which have disconnected this person from other people." How this is achieved can be illustrated with an example from the Smith film. Each psychiatric attendant, each nurse, each psychologist and each physician at the mental hospital carries a pocket filled with poker chips. Immediately after a patient shows

any adaptive behavior, he is rewarded with a poker chip. If the patient smiles in response to an appropriate stimulus such as the nurse greeting the patient with "Good morning, Sara," the nurse immediately hands the patient a poker chip. If the patient makes a coherent utterance to another patient, the attendant will hand the patient a poker chip. Any behavior, no matter how trivial, is rewarded with a poker chip if the behavior is socially acceptable or adaptive.

The patient saves the poker chips because he will use the tokens to buy highly valued items. For instance, each patient buys the bed he will sleep in that night. If one does not have many chips he must sleep on a dormitory cot; if one has more tokens he can rent a bed with a soft, comfortable mattress, and if one has still more chips he can have a private room with a view. That is how behavior modification works. When a desirable behavioral response is made, an immediate reward is given. Next, a few studies in which behavior modification was applied.

Ayllon and Azrin (1964) wanted 18 female patients, most of whom were schizophrenic, to pick up a knife, fork and spoon when they went through a cafeteria-type line for meals. After a base-line rating was taken which showed the frequency with which each girl picked up eating utensils before the experiment, the subjects were then rewarded with additional food, candy or cigarettes if they picked up the utensils.

For the first 10 trials there were no instructions, only re-

wards were given if the utensils were picked up. Only 10 percent of the Ss picked up utensils at any one meal. Then all Ss were asked to please pick up a knife, fork and spoon in return for a choice among the rewarding items. The result was that on the first trial with instructions about 50 percent of the Ss made the appropriate response. By the fifth meal, 12 of 18 Ss were responding correctly and continued to do so while the reward system lasted. After one year six Ss continued to pick up food utensils although the rewards and verbal instructions had long since been removed.

Ayllon and Azrin (1964) wanted to know whether instructions alone would change behavior or must instructions be given along with reward. They repeated their first experiment except for the first 110 meals, schizophrenic Ss (N = 20) received only verbal instructions about picking up silverware and for the next 110 meals they received instructions together with either the reward of going to the front of the serving line or a punishment by either being sent to the end of the line or waiting five minutes before being served.

The results were that the correct response was rarely given during the baseline period. With instructions only 40 percent of Ss gave the correct response on the first day which increased to 60 percent by the fifth meal. Performance on any given day was quite erratic, varying between 40 percent to 70 percent for Ss. With instructions and reward or punishment, 80 percent of the Ss

responded correctly within four meals and 90 to 100 percent by the fifth meal. This high level of performance remained constant for as long as this procedure was maintained. No data was given for the remission rate when the procedure was discontinued.

The selection of incentives which have high reward value sometimes requires inventive thinking. For example, Asher (1967) has planned an application of behavior modification to the problem of increasing the rate of verbal response from college students enrolled in introductory psychology. The design calls for the instructor to wear a cloth carney's changer around his waist which has three pockets for red, blue and white poker chips.

The students are instructed that each color has a different value depending upon the quality of verbal response. Verbal responses would be questions, examples from the student's experience which illustrate the topic under discussion, or insights. Immediately after a student's comment or question, the instructor gives a poker chip. The color of the token will depend upon the instructor's judgment of the response quality. At the end of a class period each student "cashes in" the token for points which the instructor records in his grade book.

The interesting aspect of this experiment is, what can the tokens be cashed in for? What has high reward value for college students? At first the thought was that the incentive would be a grade for class participation which had a weight along with the usual examinations. But collecting tokens for a grade may be more

punitive than rewarding because there may be strong unspoken pressure from other students not to work for a grade. The peer culture may react to verbal output for a grade as "apple polishing" or "brown-nosing."

Money would be an excellent incentive, but funds are not available and are absent as a motivator in the usual college class. On further thought, an incentive was conceptualized which was not monetary and probably would have extremely high reward value for college students. That incentive was to let the student use the poker chips to buy options. For example, at the end of the semester the accumulated points for each student would be arranged in a rank order. The students in the top 25 percent of the distribution had the option of buying back his two lowest exams or not taking the final examination. The students in the next quarter of the distribution had the option of buying back the lowest examination or not taking the final. Those in the third quarter of the distribution had the option of buying back their lowest examination score and those students in the bottom quarter had no options. Notice that there is no punishment for anyone. If one is in the bottom quarter he can't buy any options, but he has lost nothing.

Applied to In-Service Education

It seems entirely possible that an analysis of the rewards and absence of rewards within contemporary in-service practices would stimulate insights for the application of behavior modification. With behavior modification as a frame of reference it would be in-

teresting to see how many innovations in rewards can be invented especially to change teacher and administrator behavior. Not only is the nature of the incentive important, but the timing of the reward is critical. A set of readings which may generate cues for the invention and timing of rewards may be found in "Control of Human Behavior" which has been edited by Ulrich, Stachnik and Mabry (1966).

Evaluation

Perhaps the primary criterion measure for the success of most in-service programs is teacher enthusiasm. If teachers respond to a program with warmth, excitement and praise the offering is considered a success. This is similar to the observation made in the Brickell Report---that an instructional innovation is evaluated as successful if the pupils respond with enthusiasm.

Certainly the interest of the people to whom a program is directed is of high importance. This is the critical dimension of motivation. But is motivation enough? If an idea is to be documented as effected, must we measure other dimensions in addition to motivation?

These other dimensions will depend upon two factors. One is the goals for the program and the other factor is to translate the goals into operational terms.

The Mager Model

Usually, goals are expressed in abstractions which cannot be measured. For example, consider this goal from an in-service program designed for administrators: "A plan was initiated to develop the understanding and skill of about forty educators from this region in using X technique of leadership." The problem with that statement of objectives is that the abstraction "understanding and skill" could mean so many different things.

Here's another example from an in-service program created for English teachers: "The aim of Y in-service project is to acquaint

classroom teachers and administrators with the new English, develop greater knowledge of content in English on the part of those responsible for teaching it, to achieve greater articulation and to improve classroom performance at all levels."

Again the intent is expressed in abstractions (acquaint, develop, achieve, improve) which are meaningless because they do not have a reference point in the actual behavior of the learner. These abstractions are "loaded" words which communicate a sense of loftiness for the project, but can be misinterpreted. Consider other examples from Mager, (p. 11):

Words Open to Many Interpretations	Words Open to Fewer Interpretations
to know	to write
to understand	to recite
to really understand	to identify
to appreciate	to differentiate
to fully appreciate	to solve
to grasp the significance of	to construct
to enjoy	to list
to believe	to compare
to have faith in	to contrast

A statement of objectives should be written and rewritten until it answers the question, "What is the teacher doing when she demon-

strates that she has achieved the objectives?" The reader may want to test himself with these examples. Which of the following goals is stated in the performance of the teacher?

1) To develop an understanding of the New English.
2) To be able to transform sentences from the active to the passive.

Again, select one of the following goals which is expressed in the behavior of the teacher.

1) To understand Hoffman's technique of leadership.
2) To apply Hoffman's technique of leadership in three simulated classroom situations.

If you selected the second choice in each pair of objectives, you have demonstrated that you recognized when an objective was expressed in performance rather than in an abstraction.

Perhaps detailed illustrations of in-service objectives expressed in the usual vague abstractions and the same objectives rewritten applying Mager's model would be a valuable guide for people who design in-service projects. One extremely important advantage of transforming in-service objectives into behavioral terms is that the project can then be evaluated for its effectiveness. As a further suggestion, a workshop could be offered for the intended purpose of practice by the participants in transforming their in-service goals into performance using Mager's model.

The Application of Television

The cost of a television camera and tape is now so inexpensive

that it could be purchased by any school. With the means to record performance on television tape which can then be played back later, many innovations in measurement are possible.

Television has been used as a powerful technique for teacher training. One of these techniques is micro-teaching. But still another application is the evaluation of an in-service program's effectiveness.

An example of this is a pilot study by Tutko and Asher (1966). The intent was to measure the extent to which teaching behavior would change after an instructor viewed a play-back of himself teaching on television tape. The design of the study had six volunteer college instructors who consented to having one of their lectures taped in a normal classroom setting. Then, each instructor viewed his own performance and later presented the revised lecture again---this time to a different class. The second presentation was also recorded on television tape.

In the measurement phase of this study each instructor individually viewed a five-minute sample of tape randomly selected from each lecture by the five other instructors. The viewer was presented with two behavioral samples from five instructors. The viewer did not know which sample was before and which was after the experience in which an instructor viewed and critiqued himself. Each pair of before and after teaching samples was shown randomly.

The viewer simply made a paired comparison judgment by deciding which of the two samples for each instructor was better. Interestingly,

the results were no significant differences. The viewers were unable to discern any difference between the before and after samples. These results were especially intriguing when one considers that all six instructors who participated expressed high enthusiasm for viewing themselves on television tape as an effective technique for changing their own behavior.

A Design for Decision-Making

Yarbroff (1966), Clarke (1967) and Asher (1967) have suggested that the classic strategy of evaluation with experimental and control groups may not be the only possible approach to educational problems. The classic approach seems to have many limitations for complex education problems.

For example, one limitation is that the classic design is discontinuous. This means that information is usually collected in "one shot" and rarely observed over a long period of time. Secondly, comparisons across studies are extremely difficult because the frame of reference shifts from study to study. For instance, let us say that reading method A is found to be significantly better than B in school X. Then in a different study in school Y, the results show reading method C is significantly better than D. Now, what can be said about the relative effectiveness of methods A, B, C and D? Nothing. The reading methods cannot be ordered into a hierarchy of effectiveness without a third study which contrasts all four methods. Even if the four reading methods are studied in school Z, can we generalize the results to other schools where the composition

of pupils, teachers, parents and administrators is different?

A third limitation of the classic design is that results are expressed in primitive conclusions. For instance, when we conclude that reading method A is significantly better than B, this is a primitive conclusion because we do not know how much better A is when compared with B. Furthermore, better for whom? The average first grader in school X? How about first grade children above or below the mean. And, will the generalizations hold for other schools?

As an alternative to the classic discontinuous approach for evaluation, perhaps the continuous design should be considered. An application of the continuous design may be found in Yabroff's report for the Palo Alto Unified School District entitled, "Invitation to Decision."

The premise in the Yabroff report was that successful vocational decisions are a function of information available to the pupil. For example, data showed that if the student is trying to decide whether he should undertake an academic program it was unnecessary to confuse parents, students and counselors with a large number of test scores, grades and teacher recommendations. Rather, a few factors will give the student a fairly accurate notion of his likelihood of success in a variety of courses. The following experience tables (Yabroff, 1966) illustrate this point: Notice that given only one item of information, the student's 9th grade average, he can see the probability of his success in academic courses in biology, chemistry, physics, college preparatory mathematics and foreign languages. The numbers in the experience tables are probability statements, as for instance, <u>one</u> means <u>one</u> student in <u>10</u>; <u>two</u> means <u>two</u> students in <u>10</u>, and so forth.

BIOLOGY GRADES

N= 1103

Biology Grades	Below C	C	C+	B	A
A	-	-	1	2	7
B	-	1	2	3	2
C+	1	1	2	2	-
C	3	3	3	2	1
Below C	6	5	2	1	-

9th Grade Average

CHEMISTRY GRADES

N= 857

Chemistry Grades	Below C	C	C+	B	A
A	0	-	1	1	5
B	-	1	1	3	3
C+	1	1	2	2	1
C	1	3	4	3	1
Below C	8	5	2	1	-

9th Grade Average

PHYSICS GRADES

N= 336

Physics Grades	Below C	C	C+	B	A
A	0	-	1	2	5
B	0	1	2	2	3
C+	1	2	2	2	1
C	2	4	4	3	1
Below C	7	3	1	1	-

9th Grade Average

GRADES EARNED IN COLLEGE PREP MATH

- A Special Unit -

Math Grades	Below C	C	C+	B	A	A
					Boys	Girls
A	[illegible]	[illegible]	[illegible]	[illegible]	6	8
B	[illegible]	[illegible]	[illegible]	[illegible]	7	4
C+	1	1	2	3	2	2
C	2	3	3	2	-	1
Below C	7	5	3	1	-	-

9th Grade Average

GRADES EARNED IN ALL FOREIGN LANGUAGES

- A Special Unit -

No 1866

Foreign Language Grades	Below C	C	C+	B	A
A	[illegible]	[illegible]	[illegible]	1	3
B	0	1	2	3	3
C+	-	2	2	3	2
C	3	3	3	2	-
Below C	7	5	3	1	-

9th Grade Average

College Recommending Grades

This same strategy was used in assisting students to decide which college or university they may aspire to and what success they may expect.

SAN JOSE STATE
(157 Graduates)
(1960-63)

Grades after one yr.	C	C+	B to A
B to A	-	1	3
C to B	4	5	6
Below C	6	4	1

Grades in High School

UNIV. OF CALIF. Berkeley
(116 Graduates)
(1960-63)

Grades after one yr.	B	A
B to A	2	3
C to B	6	5
Below C	2	-

Grades in High School

UNIV. OF CALIF. All Campuses
(83 Graduates)
(1963 only)

Grades after one yr.	B	A
B to A	1	4
C to B	7	3
Below C	2	1

Grades in High School

STANFORD UNIV.
(107 Graduates)
(1960-63)

Grades after one yr.	B	A
B to A	1	4
C to B	7	6
Below C	2	0

Grades in High School

The continuous design means that within a school, or school system, criterion information is continually collected and stored in a computer. Criterion information would be data on ability, achievement and attitudes of pupils, and historical, attitudinal and perceptual data from teachers and administrators. An example of historical data would be: Where did the teacher take her pre-service training? An example of perceptual data would be: How do the teachers perceive the principal's style of thinking? Is he perceived as open or closed? Is he perceived as an early or late adopter of instruction innovations? An example of attitudinal data would be: What is teacher A's feeling about a particular group of first graders? As a group, would she rate them as fast, average or slow learners?

Then, with a continual flow of data from a school being stored in a computer, experience tables can be easily generated. The experience tables would not necessarily imply cause-effect relationships, but would be a valuable heuristic guide for decision-making by administrators and teachers.

As an illustration, if an administrator wanted to know how parent attitudes toward team teaching first graders in his school influenced the children's performance in second grade, an experience table could be printed out from the computer to show the relationships. The experience table might look like this:

Final Report Card in Second Grade	Negative 1	2	3	4	5 Positive
A			3	1	5
B		2	3	3	3
C	3	3	2	3	2
D	7	5	2	3	

Parental Attitudes Toward Team Teaching Their First Grade Children

Other questions the administrator could ask about team teaching and receive information from an experience table are:

1) Will the performance of second graders vary with how the children performed in the first grade with team teaching?
2) How will the performance of first graders who get team team teaching be related to their performance in a second grade which is self-contained?

For each specific question the computer can be programmed to print-out an experience table. The value of this approach is that an innovation such as team teaching can be explored in fine detail. The administrator or teacher by asking successive questions and examining the appropriate experience tables can develop a well differentiated answer which will facilitate an educational decision.

The notion of continuous design for decision-making may be a powerful tool for educational change. In this sense then it may

function as an in-service program by transmitting to school personnel information on which they can base decisions to change.

In addition, conventional in-service programs can be evaluated with the continuous design. For example, what affect has an in-service program on the ITA method of reading? The experience table might look like this:

Percentile Location of First Graders on End of Year Reading Test	ITA	Traditional Method
100%	6	2
75	2	3
50	1	2
25	1	3
0		

Future Programs

Television and Computers

(This section will be written by Gaither Lee Martin.)

Recent Proposals*

There is, at present, a growing interest in the continued education of teachers already in the classroom. Concern for in-service education programs is part of the vast effort to rennovate the educational system generally. Numerous projects in the recent past have sought to evaluate the effectiveness of computer-programmed instruction (see IPI Project, Project EDINN, CAI Project). Other programs are aimed at evaluating teacher effectiveness in the classroom (Bush and Allen, 1963; Allen and McDonald, unpublished). At the Stanford Center for Research and Development in teaching there is at present a concentrated effort being made to decipher teaching techniques proved effective in the classroom and to develop methods whereby successful technical skills of teaching can be clearly represented to teachers. Visible in this line of research is the influence of role theory and modeling behavior. Specific skills for the various subject areas taught in the schools are being isolated and identified with the idea that such skills, when imaginatively applied, are the basis for "good" teaching.

There is increasing recognition in educational research of the value of videotape and Educational Television (ETV) as tools for evaluating and instructing both teachers and students. In some quarters the attempt is being made to develop videotape data banks to contain records of teaching performance and changes which occur as the result of training. Taping lessons before and after special instruction will help measure change in style of subject

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* This section was written by George Canney.

presentation and the effectiveness of programs designed to improve teacher performance.

Until now in-service education of teachers has tended to remain outside the innovative trend in education. There has been some use of ETV (Burger, 1960; Abel, 1960; Diamond, 1961) for teacher in-service education, but its use is still not too widely spread. The emphasis placed on evaluation of teaching methods, type of population dealt with, and how behavior can be changed has yet to filter down into in-service programs. It may be that once more is known about evaluating and instituting effective teaching, in-service workshops and institutes will offer more clearly defined and readily applicable skills for reaching carefully defined populations of children.

At present there is no one publication which describes recent project proposals for teacher in-service education. One publication of the U.S. Department of Education has recently become available (ERIC) which provides short summaries of funded Title III projects and also microfiche cards describing the programs in somewhat more detail. The publication, however, reports on projects only through 1965. Moreover, a survey of the programs discussed in ERIC suggests that teacher in-service training is rarely the object of study. Usually the projects report that provisions were made for teacher in-service education and include discussion sessions, lectures and demonstrations by model teachers. (See, for example, Reading Improvement in the Detroit Great Cities Project Schools, 1963; The

Richmond Plan, 1962; and The Orientation Classes for In-Migrant Transient Children, 1963.) One exception, reported in ERIC, is a program directed by Weaver (1963) describing an in-service training program for elementary schools using modern math texts. The project lasted for 13 weeks, during which time there was a weekly half-hour ETV lesson devoted to math content and teaching suggestions. Lessons were distributed prior to each telecast with a discussion period following the telecast. Using videotape made it possible for the project director and lecturer to attend various schools during the ETV presentation and to answer questions during review and discussion periods. At the end of the 13 weeks, the general opinion was that the program was successful in improving teacher performance. Teachers, however, complained about not understanding the subject matter and found it difficult to apply the skills presented during the lectures because the directions were not explicit enough to provide direction for instructing their own classes. The Weaver project is of interest because it appears to have combined ETV with personal contact and available materials in one presentation. Like most in-service programs, however, teachers appear unable to apply what they see in their own classrooms. Before ETV can be truly effective for in-service education it may be necessary that a clearer understanding exists about what is involved in teaching effectively and, correspondingly, utilization of objective means to evaluate existing classroom conditions to determine what types of training are needed.

It was suggested by Dr. Bill McLaughlin of the U.S. Department of Education's Regional Office in verbal communication to this writer that the unavailability of information concerning current developments in the area of in-service programming causes much wasted effort, measured in time and money, because of program overlap, unnecessary repetition and costly oversights that might have been avoided. One publication which may help remedy the situation for a short time will appear under the auspices of the U.S. Department of Education this fall. Slated for limited circulation, this report will describe recent project proposals funded under Title III in an effort to determine the present status of teacher in-service education. Dr. Norman Hearne of the Office of Education (Plans and Supplementary Center) will organize the report.

In the future additional provisions are needed to make in-service programs more attractive for teachers. Dr. William Shanner of the American Institute of Research in Palo Alto, California, suggested in verbal communication that it is essential for schools to occasionally provide release time from classes for teachers either by

instituting half days or employing substitute teachers before teachers can develop enthisiasm for in-service workshops and functions. Teachers are feeling overburdened by teaching responsibilities as well as attacked by the mounting critique of our educational system. Since, at present, most promotional scales only give credit for college courses, enthusiasm for the extra work demanded by in-service training is waning. Mr. William McLaughlin reports that in summer workshops where a small monetary stipend is provided, this incentive factor encourages an active involvement throughout the entire program and, generally speaking, positive feelings of accomplishment in the participants. His recommendation, then, is that teachers be given credit for participating in in-service programs instead of the present policy of requiring attendance of teachers who already feel the imposition of heavy teaching loads and the accelerated entrance of new information into every field.

Innovations into the area of teacher in-service education have been somewhat slower in appearing than in other areas of education. It does seem, however, that in-service programs can profit from the new thinking being generated in the areas of curriculum development, teacher evaluation and programs for special populations of children. Needed is a faster and more informative system on in-service trends and research prpositions so that a more co-ordinated effort can be made to provide effective and worthwhile programs for teacher education.

Recommendations

Programs

Allen and Ryan (1966) commented that there is not a large literature available on in-service programs because "...the programs tend to be stereotyped and of a low level of imagination." (p. 16) They suggested that high quality in-service packages be created using films, and television tapes. Since the production of a first class presentation through the film or television media is a "blue chip" expenditure, these packages would seem to be a practical proposal if we assume state-wide or even national distribution. Large funding could be invested to create a high quality product, yet the cost would be quite small when pro-rated among the schools who would use the package.

Teachers

While film packages could stimulate administrator and teacher interest in a new educational innovation, a model should be created to guide local school personnel for a "follow through" to transform the idea into an application. Perhaps administrators--especially principals should be offered special workshops designed to help them organize and encourage the necessary behavior which will allow a trial for an educational innovation. Within the "follow-through" model, there should be provisions for an educational

"county agent" who has the skill and economic resources to assist early adopters in a trial within their school.

The system of incentives for teachers and administrations should be invented using principles of behavior modification as a heuristic guide. One obvious incentive is release-time from the classroom or half days periodically so that teachers and administratiors can participate in in-service programs on school time. Another incentive suggested by William McLaughlin is that he has observed from his experience that teachers paid $125. for attending a summer workshop will give $600. worth of effort and time. A certain monetary incentive, says McLaughlin, is an effective means for getting teachers to give time outside the classroom.

Another recommendation is that the contemporary concept of job advancement should be reconsidered. At present, pay raises are based on college credits. Why not credit for any change in teacher behavior which could increase her teaching effectiveness such as participation in authorized workshops?

For the beginning teacher, many changes are reccommended. For example, there is a need for close supervision especially in the early years of teaching when one is still an apprentice who is usually isolated from colleagues and receives little direction in how to teach. The role of the supervisor in

this situation should be supportive rather than critical. The supervisor should not be a critic but an understanding ally, a resource person, a model, and a friendly assistant to the new teacher.

Allen and Ryan (1966) report that one of the unique problems of teaching is that "a large number of married women leave teaching somewhere between the third and fifth year of their experience and return to teaching ten to fifteen years later, after the most demanding years of motherhood." (p. 43) An important function of in-service programs should be preparing these teachers for re-assimilation.

Physical setting

A well-organized audio-visual center for a school district would be a valuable aid for increasing instructional effectiveness. The center should not merely be a dispensary for tapes, films, and projectors, but function as a consulting service for teachers. Artists and technicians should be available to assist the classroom teacher in translating ideas into effective presentations for children.

The audio-visual center at San Jose State College under the direction of Dr. Richard B. Lewis could be a model for other A-V centers. For an interesting historical account of the problems encountered when one attempts to establish an A-V center, see "An interview with the Director of an A-V center" (Asher, 1967).

Allen and Ryan (1966) offered another interesting suggestion called the "open classroom." Traditionally, the classroom has been considered a closed sanctuary, an impregnable fortress, and an area of autonomy for the classroom teacher.

Contrast the closed classroom with the notion of an open classroom meaning that teaching becomes a group responsibility. Rather than isolation for the teacher, she experiences a maximum exchange of ideas and aid from her colleagues and supervisor. This increased aid and exchange is achieved through class visits, critique conferences, and the sharing of materials.

Evaluation

Perhaps the most important unsolved problem of in-service education is evaluation. Evaluation has two component parts. The first is: How should we evaluate teacher performance? For a stimulating discussion of this issue, see Kinney, 1957, 1963; Kallenbach, 1961, 1962, 1964; and Bradley, et al, 1960. The second is: How should we evaluate the effectiveness of in-service programs?

Perhaps most of the change in teacher and administrator behavior will depend, to a large extent, on the solutions for the evaluation problem. What is needed may be a new theory of measurement especially developed for the complex criterion problems of education.

Part of the difficulty in evaluation for any education innovation and especially those in in-service education is the ambiguous conceptualization of goals. Earlier in the paper we suggested that goals must be translated into

operational terms if measurement is to be applied for evaluation. One technique we reccommended for this translation is the guide suggested by Mager (1961).

Research

Earlier in this paper we cited evidence to show that the educational psychologist, the individual who could give strong leadership in educational innovations and the problem of evaluation, has expressed only minor interest. Somehow researchers must be made aware of critical problems in education. Perhaps the office of Education could stimulate increased interest by publishing a list of high priority problems from the field of Education which the federal government is willing to support with research grants.

This strategy has been used with inventions. The federal government has published a list of problems each of which could be solved with a future invention. And, this same strategy has been used in linguistics when the federal government published a list of neglected but critical languages which needed the attention of researchers.

Specifically, some high priority educational problems would be as follows:

What innovations in instruction will have a dramatic effect on learning in the elementary and secondary schools?

An evaluation of an innovation should show the long-term effects.

Any evaluation of an innovation should show how individual differences among children in an age group interact with the new program. It is not enough to say that on the average, technique A was significantly better than technique B. School personnel want to know how children in different parts of the ability continuum responded to the innovations. They are especially interested in children within the normal range, but who are below the mean in ability.

Perhaps there should be a clearinghouse for information on educational problems. Such a clearing house may be patterned after the one established to collect, organize, catalogue, and disseminate all information concerning research on smoking.

Abel, F. P. "Use of Closed-circuit Television in Teacher Education: Relationship to Achievement and Subject Matter Understanding." Unpublished doctoral dissertation. University of Minnesota: Minneapolis, 1960.

Addis, M. "The Teaching Force of New England from 1866 to 1888." Report of the Commissioner of Education for the Year, 1888-89, Vol, pp. 319-46; Government Printing Office: Washington, D.C., 1891.

Adorno, T. W., Frenkel-Brunswick, E., Levinson, D. J., and Sanford, R. N. The Authoritarian Personality, Harper: New York, 1950.

Ahmann, J. S., and Glock, M. D. "An Evaluation of the Effectiveness of Freshman Mathematics Course." Journal of Educational Psychology, 50, pp. 41-45, 1959.

Allen, D. W., and Ryan, K. A. "A Perspective on the Education of Teachers in California in 1980: Final Report." Project 1.2 Teacher Training, State of California, Department of Education, State Committee on Public Education, Stanford University: Palo Alto, November 1, 1966.

Allen, D., and McDonald, F. Unpublished research on evaluating technical skills of teaching using videotaping procedures. Stanford University: Palo Alto, 1967.

Asher, J. J. "Application of the Continuous Research Design to Complex Educational Problems." Far West Laboratory for Educational Research and Development: Berkeley, February 21, 1967.

Asher, J. J. "Behavioral Modification Applied to the Teaching of General Psychology." An unpublished note. San Jose State College: San Jose, June, 1967.

Asher, J. J. "Interview of Innovators: Director of Audio-Visual Services of a State College." Far West Laboratory for Educational Research and Development: Berkeley, June 23, 1967.

Ayllon, T., and Azrin, N. "Reinforcement and Instructions with Mental Patients." Journal of Experimental Analysis of Behavior, 7 (4), pp. 327-331, 1964.

Beach, J., and Asher, J. J. "Report on Personality of Teachers." Far West Laboratory for Educational Research and Development: Berkeley, February 6, 1967.

Berge, M. L., Russell, H. E., and Walden, C. B. "In-Service Education Programs of Local School Systems." In-Service Education for Teachers, Supervisors, and Administrators, University of Chicago Press: Chicago, pp. 197-223, 1957.

Bialek, H. M., Montague, E. K., and McNeil, M. "An Assessment of Educational and Cultural Needs in Three Counties: San Benito, Santa Cruz, and Monterey, California." Project PEIMS (Project for Educational Innovation), George Washington University: Washington, D.C., 1965.

Bialek, M. M., Montague and McNeil, M. "An Assessment of Educational and Cultural Needs in Three Counties: San Benito, Santa Cruz, and Monterey, California." Summary Report, Project EDINN (Project for Educational Innovation), George Washington University: Washington, D.C., 1966.

Bradley, R., Kinney, L. B., Owen, V., and Washington E. "A Criterion for the Appraisal of Student Teachers." Evaluating Student Teachers. Thirty-ninth Yearbook, Association for Student Teaching, William Brown Co.: Dubuque, 1960.

Brickell, H. M. "A Study of the Dynamics of Instructional Change in the Elementary and Secondary Schools of New York State with Recommendations for Improved Organization." Organizing New York State for Educational Change. University of the State of New York, State Education Department: Albany, p. 107, 1961.

Brudbaugh, R. B., Hordt, K. C., and Betsel, Jr., W. H. "Teacher Dogmatism and Perceptual Accuracy." The Journal of Teacher Education. 17, pp. 332-337, 1966.

Burger, E. "The Use of Television for Inservice Teacher Training." Unpublished Doctoral dissertation. University of Virginia: Charlottesville, 1960.

Bush, R., and Allen, D. "Microteaching: Controlled Practice in the Training of Teachers." Stanford University: Palo Alto, 1963.

Carney, L., and Asher, J. J. "Report on Behavioral Modification." Far West Laboratory for Educational Research and Development: Berkeley, January 5, 1967.

Clarke, Robert, Gelatt, H. B., and Levine, Louis. "A Decision-Making Paradigm for Local Guidance Research." Personnel and Guidance Journal, pp. 40-51, 1965.

Clarke, R. S. "A Proposal for the Development of a Model Institutional Research System in the Department of Psychology." San Jose State College: San Jose, 1967.

Corey, Stephen M. In-Service Education for Teacher, Supervisors, and Administrators. Ch. I. University of Chicago Press: Chicago, pp. 1-11, 1957.

Cox, R. C. "Individually Prescribed Instruction Project." IPI. University of Pittsburg: Pittsburg, 1966.

Diamond, G. A. "Science Education XTV 104A and B: A Televised In-Service Extension Course and Associated Laboratory for Elementary School Teachers and Administrators." (mimeographed), San Jose State College: San Jose, Spring, 1961.

Ekstorm, F., and Berry, D. Draft working paper for Project C staff meeting. Far West Laboratory for Educational Research and Development: Berkeley, March 3, 1967.

Feather, N. T. "Cognitive Dissonance, Sensitivity, and Evaluation." Journal of Abnormal and Social Psychology, Vol. 66, No. 2, pp. 157-163, 1963.

Feldman, M., et al. "The Richmond Plan." ERIC: ED002670, San Francisco, 1962.

Greenhill, L. P. "A Review of Some Trends in Research on Instructional Films and Instructional Television." Abstracts of Research on Instructional Television and Film, D. W. MacLennan and J. C. Reid, (eds.), Institute for Communication Research, Stanford University: Palo Alto, Vol. I, pp. 1-32, April 1964.

Gube, E. "Related Research and Development." Research Proposal. Ohio State University: Columbus, pp. 19-21, 1965.

Harrington, Sister Mary, and Durrell, D. D. "Mental Maturity Versus Perception Abilities in Primary Reading." Journal of Educational Research, 46, pp. 375-380, 1956.

Henry, Nelson B., (ed.), In-Service Education for Teachers, Supervisors and Administrators, University of Chicago Press: Chicago, p. ix, 1957.

Jackson, P., and Lahaderne, H. "Scholastic Success and Attitude Toward School in a Population of Sixth Graders." Journal of Educational Psychology, 58, pp. 15-18, 1967.

Jones, S., and Gaier, E. L. "A Study of Anti-Democratic Potential of Teachers." Journal of Educational Research, 47, pp. 1-10, 1953.

Juul, K. D. "Authoritarian Personality in Relation to Teachers Attitudes Toward Child Behavior." Unpublished doctoral dissertation, Wayne University: Detroit, 1953.

Kallenbach, W. "Proceedings: Conference on In-Service Education," Far West Laboratory for Educational Research and Development: San Jose, December 1-2, 1966.

Kallenbach, W. "Can We Measure Success in Teaching?" California Elementary Administrator, January, 1967.

Kallenbach, W. "The 101A Teacher Evaluation Program," California Elementary Administrator, Vol. 28, No. 2, December, 1964.

Kallenbach, W., and Owen, V. "Measuring Teaching Effectiveness: A Training Program for California Administrators." California Elementary Administrator, March, 1962.

Kinney, L. B., et al. "A Design for Teacher Evaluation." National Elementary Principal, Vol. 43, No. 2, November, 1963.

Levinson, D. J., and Schwarzhorn, R. A. "Emotional Attitudinal Effects of an Intergroup Relations Workshop on Its Members." Journal of Psychology, 31, pp. 243-256, 1951.

Lippitt, R., et al. "The Teacher As Innovator, Seeker, and Sharer of New Practices." Perspectives on Educational Change, Appleton-Century-Crofts: New York, pp. 310-311, 1967.

Lowry, C. D. "The Relation of Principals and Superintendents to the Training and Improvement of Their Teachers." Seventh Yearbook of the National Society for the Study of Education, Part I, University of Chicago Press: Chicago, pp. 12-15, 1908.

McManis, J. T. "Problems of the Institute." Elementary School Teacher, IV, pp. 232-39, December 1903.

Mager, R. F. Preparing Objectives for Programmed Instruction. Fearon Publishers: San Francisco, 62 pp., 1961.

Mann, H. "To Public School Teachers." September, 1845, Reproduced in Samuel H. Sweet, Teachers Institutes or Temporary Normal Schools...Including a Synopsis of Their Proceedings. H. H. Hawley & Co.: Utica, pp. 45-56, 1848.

Milwaukee Public Schools, "Orientation Classes for In-migrant Transient Children; Milwaukee, Wisconsin." ERIC: Washington, D.C., ED002722, 1963.

Parker, J. "Guidelines for In-Service Education." In-Service Education for Teachers, Supervisors, and Administrators. University of Chicago Press: Chicago, pp. 103-128, 1957.

Pervin, L. A., and Yatko, R. J. "Cigarette Smoking and Alternative Methods of Reducing Dissonance." Journal of Personality and Social Psychology, Vol. 2, No. 1, pp. 30-36, 1965.

Rasschaert, W., and McNeil, S. "Reading Improvement in the Detroit Great Cities Project Schools." ERIC: Washington, D.C., ED002462, 1963.

Richey, H. "Growth of the Modern Conception of In-Service Education." In-Service Education for Teachers, Supervisors, and Administrators, University of Chicago Press: Chicago, pp. 35-68, 1957.

Rogers, E. M. Diffusion of Innovations, The Free Press of Glencoe: Glencoe, 1962.

Reudiger, W. C. "Agencies for the Improvement of Teachers In Service." United States Bureau of Education Bulletin, Government Printing Office: Washington, D.C., No. 3, p. 32, 1911.

Searley, H. "Practical Value of the Institute System." Educational Review, XXXVI, pp. 356-63, November 1908.

Smart, H. "Teachers' Institutes." Bureau of Education Circulars, Government Printing Office: Washington, D.C., No. 2, pp. 7-8, 1885.

Tutko, T. A., and Asher, J. J. "A Short-Term Pilot Project on the Improvement of College Teaching." San Jose State College: San Jose, January 25, 1966.

Ulrich, R., Stachnik, R., and Mabry, J. Control of Human Behavior. Scott, Foresman & Co.: Glenview, pp. 349, 1966.

Updegraff, H. "Teacher Certificates Issued Under General State Laws and Regulations." United State Bureau of Education Bulletin, Government Printing Office: Washington, D.C., No. 18, 1911.

Van Dalen, D. B. "How to Facilitate Change." American School Board Journal, No. 149, pp. 7-9, November 1964.

Weaver, J. F. "Foundations of Mathematics for Elementary Schools: An In-Service Project." Arithmetic Teacher, October, 1963.

Westby-Gibson, Dorothy, Working paper on selected literature relating to in-service education of teachers. Far West Laboratory for Educational Research and Development: Berkeley, April 7, 1967.

Wilson, H. A. "A Tool for Teaching and Research." Computer Assisted Instruction [CAI]. Stanford University: Stanford 1966.

Zdravkovich, W. M. "A Guide Designed for Group Instruction to Develop Individual Skills in Decision-Making." Invitation to Decision, Guide I, Sponsored by Funds from the National Defense Education Act, pp. 88, 1966.